

**AMENDMENTS TO THE CLAIMS:**

**Complete Listing of Claims**

- 1        1. (previously presented) Apparatus for simultaneously making electrical contact with an array of spherical contact points having a first selected pattern on a circuit, comprising:
  - 4              a support substrate having a working surface and a back side, said support substrate defining a multiplicity of apertures extending from said backside through said substrate and terminating at said working surface according to a second selected pattern corresponding to a mirror image of said first selected pattern;
  - 9              a multiplicity of conductive probes, said conductive probes extending from a first end at said back side of said support substrate, through said apertures to a contact end located a selected distance beyond said working surface wherein said contact ends of said conductive probes are substantially flat;
  - 13             at least one aperture of said multiplicity of apertures including at least two conductive probes extending there-through;
  - 15             a multiplicity of conductive pathways extending from said first end of said conductive probes to selected circuitry; and
  - 17             said conductive probes positioned through said support substrate to make electrical contact with the spherical contact points on a circuit placed against said apparatus.
- 1        2. (currently amended) The apparatus of Claim 1 wherein said conductive probes have a footprint at least as large as a the solder ball diameter of the spherical contact points.

1    3. (original) The apparatus of Claim 1 wherein said contact points are  
2    conductive bumps or balls.

1    4. (original) The apparatus of Claim 1 wherein said at least two conductive  
2    probes extending through said at least one aperture are connected one each to  
3    a voltage source line and a voltage sensing device.

1    5. (previously presented) The apparatus of Claim 4 further including a third  
2    conductive probe connected to another voltage source.

1    6. (original) The apparatus of Claim 1 wherein said apparatus is a probe card  
2    for testing integrated circuits

1       7. (previously presented) Apparatus for simultaneously making electrical  
2       contact with an array of spherical contact points positioned according to a first  
3       selected pattern on a circuit comprising:  
4               an insulating support substrate having a working surface and a back side;  
5               a multiplicity of conductive probes, each of said conductive probes  
6       extending from a first end at said backside of said substrate, through said  
7       substrate to a contact end, contact ends of said multiplicity of conductive probes  
8       extending a selected distance beyond said working surface and terminating at a  
9       multiplicity of locations arranged according to a second selected pattern  
10      corresponding to a mirror image of said first selected pattern and wherein said  
11      contact ends of said conductive probes are substantially flat;  
12               at least two conductive probes of said multiplicity of conductive probes  
13      having their ends adjacent each other at a single one of said multiplicity of  
14      locations; and  
15               said contact ends of said conductive probes positioned through said  
16      support substrate to make electrical contact with selected ones of said spherical  
17      contact points on a circuit placed against said apparatus.

1       8. (original) The apparatus of Claim 7 wherein at least two of said multiplicity of  
2       locations include at least two of said conductive probes.

1       9. (original) The apparatus of Claim 7 wherein at least two of said multiplicity of  
2       locations include at least three of said conductive probes.

1       10. (original) The apparatus of Claim 7 wherein said apparatus is a probe card  
2       for testing integrated circuits.

1        11. (currently amended) A method of manufacturing apparatus for  
2        simultaneously making electrical contact with an array of spherical contact points  
3        on circuitry, said array of contact points positioned according to a first selected  
4        pattern, comprising the steps of:

5                providing a support substrate having a working surface and a backside;

6                defining a multiplicity of apertures extending from said backside through  
7        said substrate and terminating at said working surface according to a second  
8        selected pattern, said second selected pattern corresponding to a mirror image  
9        of said first selected pattern;

10                extending each of a first end of a multiplicity of first conductive probes  
11        through each aperture of said multiplicity of apertures such that a first end of  
12        each of said first conductive probes is at said back side and a contact end of  
13        each of said first conductive probes extends a selected distance beyond said  
14        working surface;

15                extending a second conductive probe having a first end and a contact end  
16        through at least one of said multiplicity of apertures; and

17                positioning said multiplicity of apertures such that said contact ends of  
18        said first conductive probes and said second conductive probes are aligned to  
19        make electrical contact with at least a portion of said array of spherical contact  
20        points of a circuit placed against said apparatus and wherein said contact end of  
21        said first conductive probes and said second conductive probes are substantially  
22        flat.

1        12. (previously presented) The method of Claim 11 further comprising the steps  
2        of placing circuitry having an array of contact points against said apparatus and  
3        testing said circuitry.

1       13. (original) The method of claim 11 wherein a selected probe of said  
2       multiplicity of first conductive probes is for supplying a selected voltage and said  
3       second conductive probe adjacent said selected probe is for sensing a voltage.

1       14. (previously presented) A method of manufacturing apparatus for  
2       simultaneously making electrical contact with an array of spherical contact points  
3       on circuits, having said array of contact points positioned according to a first  
4       selected pattern, comprising the steps of:

5               providing a support substrate having a backside and a working surface;  
6               extending a multiplicity of first conductive probes through said support  
7       substrate, each of said first conductive probes extending from a first end at said  
8       backside of said substrate, through said substrate to a contact end, said contact  
9       ends of said conductive probes extending a selected distance beyond said  
10      working surface and terminating at a multiplicity of locations according to a  
11      second selected pattern corresponding to a mirror image of said first selected  
12      pattern;

13               extending at least one second conductive probe having a first end and a  
14       contact end through said substrate, said contact end of said at least one second  
15       conductive probe terminating adjacent the contact end of one of said multiplicity  
16       of first conductive probes; and

17               positioning said first conductive probes and said second conductive probe  
18       such that said contact ends of said first conductive probes and said second  
19       conductive probe are aligned so as to make electrical contact with said array of  
20       spherical contact points of a circuit placed against said apparatus and wherein  
21       said contact ends of said first and second conductive probes are substantially  
22       flat.

1    15. (previously presented) The method of Claim 14 further comprising the  
2    steps of placing circuitry having an array of contact points against said apparatus  
3    and testing said circuitry.

1    16. (original) The method of claim 14 wherein a selected probe of said  
2    multiplicity of first conductive probes is for supplying a selected voltage and said  
3    second conductive probe adjacent said selected probe is for sensing voltage.

Claims 17-22 (canceled)

1    23. (currently amended) The apparatus of Claim 7 wherein said conductive  
2    probes have a footprint at least as large as a the solder ball diameter of the  
3    spherical contact points.

1    24. (currently amended) The apparatus of Claim 7 wherein said conductive  
2    probes have a footprint smaller than a approximately as large as the solder ball  
3    diameter of the spherical contact points.

1    25. (currently amended) The method of Claim 11 wherein said conductive  
2    probes have a footprint at least as large as a the solder ball diameter of the  
3    spherical contact points.

1    26. (currently amended) The method of Claim 11 wherein said conductive  
2    probes have a footprint smaller than a approximately as large as the solder ball  
3    diameter of the spherical contact points.

1    27. (currently amended) The method of Claim 14 wherein said conductive  
2    probes have a footprint at least as large as a the solder ball diameter of the  
3    spherical contact points.

1    28. (currently amended) The method of Claim 14 wherein said conductive  
2    probes have a footprint smaller than a approximately as large as the solder ball  
3    diameter of the spherical contact points.